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Taxonomic Notes on Some Mangrove-inhabiting Birds in Australasia

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Abstract

Geographic variation is described and the taxonomy revised in the following species that occur in mangroves in Australasia: *Eulabeornis castaneoventris, Halcyon chloris, Alcedo pusilla, Microeca tormenti, Eopsaltria pulverulenta, Pachycephala melanura, P. simplex, P. lanioides, Myiagra ruficollis, M. alecto, Rhipidura rufifrons, Gerygone tenebrosa, G. magnirostris, Conopophila albogularis, Myzomela erythrocephala, Zosterops lutea* and *Cracticus quoyi.* The relationships of some of these species are discussed.

Introduction

Australia has a fairly large number of birds confined more or less to mangrove vegetation. While researching the origin, evolution and speciation of this assemblage (Ford 1982), I assessed current views on geographical variation and taxonomy of each species. For several species it was necessary to carry out taxonomic revisions. This report contains the results of revisions on taxonomy and some conclusions on evolution of these species.

The following species were excluded because their variation has recently been discussed elsewhere: Mangrove Heron *Butorides striatus* (Schodde *et al.* 1980), Little Bronze-cuckoo *Chrysococcyx minutillus* (Ford 1981*a*), Mangrove Fantail *Rhipidura phasiana* (Ford 1981*b*), Mangrove Warbler *Gerygone levigaster* (Ford 1981*c*) and Mangrove Honeyeater *Lichenostromus versicolor* (Ford 1978*a*).

Specimens were examined at the American Museum of Natural History (AMNH) and British Museum (Natural History) (BMNH) in 1976 during tenure of a Frank M. Chapman Fellowship. Specimens were borrowed from the Queensland Museum (QM), Australian Museum (AM), National Museum of Victoria (NMV), South Australian Museum (SAM), National Wildlife Collection, Canberra (CSIRO) and Northern Territory Museum, Arid Zone Research Institute (NTM) and studied at the Western Australian Museum (WAM).

The length of the bill was measured from the tip to the base of the skull to the nearest 0.1 mm, the width of the bill across the middle of the nares to 0.1 mm, the length of the wing as the flattened chord to 0.5 mm, the length of the tail from the outside base of an innermost rectrix to the tail tip to 0.5 mm, and the

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length of the tarsus from the back of the heel to the lowest edge of the last full scale on the front of the tarsus to 0.1 mm. Only measurements of adults are given in tables. Gazetteers that include the localities mentioned in the text are given in Mayr (1941*b*) and Storr (1967, 1973, 1977, 1980).

Species List

Eulabeornis castaneoventris Chestnut Rail

The Chestnut Rail inhabits dense forest of estuarine mangroves between Derby (King Sound) and the Smithburne River (eastern side of Gulf of Carpentaria), and on the Aru Islands. There are no records between the McArthur and Albert Rivers (Storr 1973, 1977, 1980). Hartert (1927) recognized the subspecies *sharpei* for the Aru Islands and placed all Australian populations in nominate *castaneoventris.* However the type (AMNH) of *sharpei,* which is reddish-brown on the back wings and tail, matches exactly some adult specimens from Melville Island and south-western Cape York Peninsula. Individuals in any population apparently vary in coloration of the dorsum from chestnut to olive: all specimens from the Kimberley (Table 1) have an olive dorsum except one in which a few chestnut feathers are replacing old, olive feathers; specimens from Melville Island vary; and the only specimen from near the head of the Gulf of Carpentaria is chestnut. Specimens with a chestnut dorsum are usually long-winged and so might be old adults. Measurements of *sharpei* fall within the range of variation of Australian birds (Table 1). Until variation in coloration is understood, no subspecies should be accepted.

Halcyon chloris Collared Kingfisher

This kingfisher occurs in coastal mangroves and offshore islands between Shark Bay and north-eastern New South Wales (Serventy and Whittell 1976; Storr 1973). Elsewhere it ranges from the region of the Red Sea, through southern Asia, to northern Polynesia and has been divided into about fifty subspecies (Mayr 1931, 1941*a*, 1949). Australian populations are currently considered to compose one subspecies *sordida,* which extends into southern New Guinea (between China Straits and the Mimika River) and the Aru Islands (Keast 1957; Mayr 1941*b*). It is replaced by nominate *chloris* in western New Guinea and *colona* on the eastern satellite islands of New Guinea. The eastern and western Australian populations of *sordida* migrate northward in winter to southern New Guinea (Keast 1957) but, as judged on specimen records, it may be resident in Kimberley and Northern Territory and some birds winter on Cape York Peninsula.

Though similar to nominate *chloris* in size (Table 2), *sordida* is distinguished by its dusky olive-green crown and back. Mature *sordida* are less dusky, more greenish on the crown and more blue-green on the back and rump than juveniles. Immatures of *chloris* are also dusky above but those of *sordida* are duskier. Males

are brighter than females on the primaries and tail in both subspecies. The type locality of *sordida* is accepted as Cape York (Condon 1975) and only dusky specimens have been collected from Shark Bay to Cape York. However, most specimens from central Queensland, south-eastern Queensland and north-eastern New South Wales are less dusky above, darker and brighter blue on the wings and tail, and more bluish, less greenish, on the rump than *sordida.* They could represent a dimorphism or a separate subspecies *colcloughi.* The form *colona* on the eastern Papuan islands is smaller than *sordida* (Ogilvie-Grant 1915; Rand and Gilliard 1975). The population on the Pilbara coast is also characterized by short wings (Table 2). Until the basis for the variation in colour of southernmost eastern Australian birds is understood, only two subspecies seem acceptable for Australia: *sordida* and an unnamed population in the Pilbara.

Alcedo pusilla Little Kingfisher

This species ranges from the Moluccas through New Guinea and northern Australia to the Solomon Islands. It has three isolates in Australia: Northern Territory between Anson Bay and the Roper River, including Melville Island and Groote Eylandt; Cape York Peninsula south on the Gulf coast to the Archer River and on the east coast to the Chester River; and north-eastern Queensalnd between Cairns and Townsville, including the Atherton region and Hinchinbrook Island (Keast 1957; Storr 1973, 1977; Anon. 1976). Keast (1957) divided Australian populations into two subspecies: *ramsayi* for the Northern Territory and *halli* for north-eastern Queensland; populations on Groote Eylandt and Cape York Peninsula were considered to have hybrid characteristics.

Size differences between the Australian isolates and nominate *pusilla* of southern New Guinea are slight (Table 3) but there are distinct differences in coloration: *ramsayi* is a pale royal blue, *halli* deep royal blue and *pusilla,* deep purplish-blue (darker than *halli*). Most specimens (AMNH) from Cape York Peninsula available to Keast were in various stages of plumage between the juvenile and adult phases. Juveniles have the upperparts and sides of breast more greenish and dusky, the breast with some blackish barring, the forehead scalloped and the supraloral and neck spots tinged orange (Ogilvie-Grant 1915; Anon. 1976; pers. obs.). Juveniles of *ramsayi* are more greenish or turquoise than those of *halli.* Adult specimens from Cape York Peninsula are more like *halli* in coloration though those from the western side are somewhat pale, possibly because of gene flow from *pusilla.* Accordingly, I accept the subspecies proposed by Keast but include the population on Groote Eylandt in *ramsayi* and that on Cape York Peninsula in *halli.*

Two subspecies are recognized for New Guinea (Mayr 1941*b*; Rand and Gilliard 1967): *laetior* in northern New Guinea between Geelvink Bay and Astrolabe Bay, and *pusilla* in the rest of New Guinea, including its western and eastern satellite islands and Torres Strait islands. The subspecies *laetior* is similar to nominate *pusilla* but paler and brighter. Mayr and Rand (1937) remarked on the

variation in *pusilla* but their specimens (AMNH) were in various stages of plumage between the first-year and adult phases (pers. obs.).

Microeca tormenti Kimberley Flycatcher

This species occurs between Napier Broome Bay (Pago) and Barred Creek and on islands in the Bonaparte Archipelago. It is confined to dense mangroves whereas *M. flavigaster* favours open forest and only occasionally occurs in mangroves (and monsoon forests). Any lingering doubts that *tormenti* occurred outside the Kimberley (Seyfort 1973) were dispelled by Mason (1977) who showed that records of it in the Northern Territory were based on misidentifications of *Pachycephala simplex*. Formerly known as *M. brunneicauda,* Parker (1973) discovered that Campbell's type was a specimen of *P. simplex*. Vaurie (1953) considered it to be a geographical representative of *M. flavigaster* that had lost carotenoid pigments, a view accepted by Ford (1978*b*) and Schodde (1981). Table 4 shows that *tormenti* is fairly similar to the geographically nearest population of *flavigaster* (the nominate form in the Northern Territory) in dimensions including bill width. *M. tormenti* is drab like *M. leucophaea* but has no white on the tail and has yellowish rather than buffy under-wing coverts.

Eopsaltria pulverulenta Mangrove Robin

In Australia the Mangrove Robin ranges between Exmouth Gulf and Cardwell. It occurs on some inshore continental islands (Dampier Archipelago, Bonaparte Archipelago) Melville Island, Bickerton Island, Sir Edward Pellew Group, Clerke Island and Hinchinbrook Island, and has gaps along the Eighty Mile Beach, Joseph Bonaparte Gulf, parts of the Gulf of Carpentaria (Galbraith 1974) but not round Cairns (*pace* Storr 1973). On mainland New Guinea it occurs from Killerton Island west along the south coast to the Utanata River, and at Geelvink Bay, Humboldt Bay and the Sepik River upstream to Kanganaman (Gilliard and LeCroy 1966). It is fairly common in many parts of Australia (Pilbara, Kimberley, Melville Island, Karumba, Cape York and Cardwell) but appears to be generally uncommon in New Guinea and Aru Islands except perhaps the southern coast of Irian Jaya.

Though Mayr (1914*b*), Keast (1958) and Rand and Gilliard (1967) collectively recognized four subspecies, geographic variation is slight (Tables 5 and 6). Northern and north-eastern Australian and New Guinea birds have longer wings and tails and shorter bills on average than Pilbara and western Kimberley birds. Table 5 indicates that the change in size is stepped on the western side of the Joseph Bonaparte Gulf. Specimens from the Northern Territory and Melville Island are more blackish on the crown and auriculars than those from elsewhere (Table 6). Newly-plumaged specimens from all populations are fairly alike in coloration of the back and wings; however, faded and worn-plumaged specimens from the Pilbara are paler and browner than those from other populations. Subspecific

divisions in *E. pulverulenta* differ if size and head coloration are used independently as criteria; so current divisions are not accepted.

Keast (1958) considered *pulverulenta* to have no close relatives and placed it in a monotypic genus *Peneoenanthe* rather than in *Peocilodryas* as Mayr (1941*c*) tentatively suggested or in *Eopsaltria* as Storr (1973) and Parker (1979) proposed. It is characterized by a strong large bill, prominent rictal bristles, rounded tail, absence of wing-bar, and large patches of white on the tail. Similarities to *Eopsaltria* not admitted by Keast are: streaked and speckled juvenile plumage (*pace* Galbraith 1974); coloration of eggs as in *australis* and *georgiana* (*pace* Keast 1958), dorsal grey as specially in *georgiana,* ventral pattern including diffuse grey gorget as in *georgiana,* and perhaps *griseogularis,* stoutness of bill as in *E. australis 'magnirostris',* behavioural mannerisms, feeding niche and general coloration like *georgiana.* Thus differences between *pulverulenta* and other species in *Eopsaltria* are best viewed as strongly specific. Schodde (1981) has expressed similar views. *E. pulverulenta* is not a member of *Poecilodryas* which is characterized by prominent superciliary, prominent wing patch and uniformly chocolate to rufous brown plumage in the juvenile. *Poecilodryas* species also have a strong stout bill and prominent rictal bristles.

Pachycephala melanura Mangrove Golden Whistler

P. melanura occurs between Exmouth Gulf and Mackay including many offshore islands (Storr 1973, 1977, 1980) in northern Australia, on many islands in Torres Strait, between Merauke and Milne Bay, on some islands (Teste and Fergusson) in the d'Entrecasteaux Archipelago and on a string of small islands from the Vitiaz and Dampier Straits through the Bismarcks east to Nissan Island and possibly to the Solomon Islands (Galbraith 1956, 1967; Rand and Gilliard 1967; Storr 1973, 1977, 1980; Diamond 1975, 1976). On mainlands it inhabits mangroves whereas on islands it also frequents subhumid scrubs, second-growth scrub-formations and depauperate rainforest. It has gaps in range along the Eighty Mile Beach (between Cape Keraudren and Frazier Downs) and apparently along the north-eastern coast of Queensland (no record between Cape Grenville and Bowen) and has rarely been recorded in central coastal Queensland (Edgecumbe Bay, Bowen; Daydream Island, Whitsunday Group; Seaforth (= Springcliff); Mackay (two specimens in AM) but not the Percy Isles (*pace* Galbraith 1974; QM specimen is *pectoralis*). Three subspecies are currently recognized; *melanura* (Exmouth Gulf to Port Warrender), *spinicauda* (synonyms *hilli* and *violetae;* Napier Broome Bay to Mackay, Torres Strait, Merauke to Hall Sound), and *dahli* (Hall Sound to Nissan Island).

Mayr (1954), Galbraith (1956, 1967) and Ford (1971) have described geographic variation in *P. melanura.* This is slight in males and striking in females. Adult females of *spinicauda* and *dahli* differ from those of *melanura* in being richly yellow rather than whitish on the lower breast, abdomen and flanks; olive rather than grey on the mantle; and more blackish, less olive, on the tail. Adult

males of *spinicauda* and *dahli* differ from those of *melanura* in being more intensely yellow ventrally and having a wider yellow collar and a wider pectoral black band. The forms *melanura* and *spinicauda* intergrade between Port Warrender and Napier Broome Bay; here females are varying shades of pale yellow on the belly (Table 7). On proceeding from Napier Broome Bay to Nissan Island, ventral yellow in females becomes more intense, the dorsum becomes more olive and the amount of black on the tail increases but these trends are clinal (Galbraith 1956). There are also some clinal trends in males; for, on proceeding from Exmouth Gulf to Nissan Island, ventral yellow becomes richer, the yellow collar widens, the dorsum becomes more yellowish, and the olive on the tail decreases. In nominate *melanura* there are slight differences in coloration between the populations on opposite sides of the Eighty Mile Beach but these may be associated with clinal trends perhaps accentuated by the gap in range. Size of wing, tail and bill apparently increase in both sexes on proceeding from the Kimberley to Nissan Island (Galbraith 1956; Table 8), and the Pilbara population is apparently longer in wing and tail than the southern Kimberley population of *melanura.* Differences between *spinicauda* and *dahli* are slight and apparently they intergrade gradually (Galbraith 1956; pers. obs.): the adult female of *dahli* is more olive above, more streaked and barred on the throat, darker on the crown and more intensely yellow below; adult males of *dahli* have narrower grey edging, and hence more black, on the remiges. There seems little point in retaining *dahli.* Therefore only two subspecies, *melanura* and *spinicauda* are accepted.

Pachycephala melanura is a member of the *P. pectoralis* superspecies (Galbraith 1956, 1967). Indeed Galbraith (1956), Mayr (1954), Ford (1971) and Storr (1973, 1977, 1980) treated these as conspecific. Mayr believed the presence of buff and reduced yellow on the belly of female specimens (AMNH) of *P. m. spinicauda* round Torres Strait (Cape York, islands in Torres Strait and Daru region) indicated that they had been affected by intrusion of genes from *P. p. queenslandica* which is ochraceous on the belly of females. However, ventral buff in *spinicauda* is a characteristic of first-years and subadults only (Galbraith 1967, pers. obs.) and the specimens with ventral buff seen by Mayr were not adults (pers. obs.). Galbraith (1956) claimed that *P. p. whitneyi* was a variable hybrid population between *P. m. dahli* and *P. p. bougainvillei* and that in the Louisiades *P. p. collaris* was affected by *dahli* genes. Nevertheless, he later (1967) considered *P. m. spinicauda* and *P. p. queenslandica* had abutting ranges and were ecologically (and hence intrinsically) isolated in mid-eastern Queensland but overlooked that *queenslandica* breeds in highland rainforests and subhumid scrubs (500-1500 m) and is only an altitudinal migrant to lowlands in winter (Storr 1973). The significance of *P. pectoralis* in rainforest in the Iron Range area (Forshaw and Muller 1978) is not known but clearly the buffiness in populations of *spinicauda* round Torres Strait is not caused by *queenslandica* genes. The best evidence for *P. melanura* and *P. pectoralis* being separate species is that of Diamond (1975, 1976) who found a chequer-board pattern of distribution, yet no hybridization,

in *P. p. citreogaster* and *P. m. dahli* on islands between New Guinea and the Bismarcks.

On the assumption that *P. melanura* evolved somewhere in its present area of distribution, it must have arisen in either north-western Australia, north-eastern Australia, south-eastern New Guinea, or the Bismarcks. In all these areas except north-western Australia it is sympatric or parapatric with some form of *P. pectoralis*. Consequently north-western Australia seems to have been its area of origin. Galbraith (1956) also believed it reached the Bismarcks rather recently.

Pachycephala simplex Grey Whistler

New Guinean populations fall into two groups: the yellow-bellied, olive-backed subspecies of the *griseiceps* group and the white-bellied, brownish-backed subspecies of the *dubia* group (Mayr 1941*b*; Rand and Gilliard 1967; Schodde and Hitchcock 1968). The yellow-bellied group occupies the Aru Islands, western Papuan islands and New Guinea east to about Galley Reach (near Port Moresby) and Astrolabe Bay where it hybridizes (Mayr and Rand 1937; Rand and Gilliard 1967) with the white-bellied group of extreme eastern and north-eastern New Guinea (bordering the Solomon Sea), d'Entrecasteaux Archipelago and Tagula Island of the Louisiade Archipelago. The species also occurs on the Moluccan Islands. It inhabits the substage and lower trees of forest (mainly edges) and dense second-growth forest and undergrowth from sea level up to 1500 m.

The two Australian subspecies are peripheral populations that parallel precisely the geographical variation in New Guinea (Mayr 1954) but may represent a twin invasion by yellow-bellied stock. The subspecies *peninsulae* of the humid zones of north-eastern Cape York Peninsula and north-eastern Queensland is yellow-bellied and has a more conspicuous gorget and brighter dorsum than *perneglecta*, the geographically closest subspecies in New Guinea; it is a weak differentiate and occupies the same habitats as New Guinean forms. The subspecies *simplex* of northern coastal Northern Territory (including Melville Island and Groote Eylandt) is white-bellied and brownish on the dorsum but, on geographical grounds, was probably derived from the yellow-bellied group of New Guinea. If this was so, the independent evolution of two white-bellied forms (*dubia/sudestensis* and *simplex*) would support Galbraith's (1974) conclusion that *simplex* and *griseiceps* are conspecific. *P. s. simplex* lives in mangroves, monsoon forests and swamp-paperbarks; its presence in mangroves had led to its confusion with *Microeca tormenti* (Parker 1973; Mason 1977). The species is absent from most of the coastline of the Gulf of Carpentaria; there are no records between Port Bradshaw and Weipa.

Pachycephala lanioides White-breasted Whistler

The White-breasted Whistler is distributed in mangroves between Shark Bay (Peg's Beach) and the head of the Gulf of Carpentaria (lower Norman River). A recent record from Yandaran, Queensland (Tucker 1977; pers. comm.), requires confirmation. It occurs on Legendre, Enderby and West Lewis Islands in the

Dampier Archipelago, Melville Island and Sir Edward Pellew group, and has gaps in range between Carnarvon and North West Cape, between Pardoo (Cape Keraudren) and Frazier Downs (Whistle Creek) and between the Prince Regent River and Cambridge Gulf.

Mayr (1954), Mees (1964) and Galbraith (1974) accepted three subspecies: *carnarvoni* in mid-Western Australia and Pilbara, *lanioides* in west Kimberley; and *fretorum* between Wyndham and Karumba (Norman River). Though it is uncertain whether the type locality of *fretorum* is Wyndham or Karumba (Mees 1964), the northern population is properly designated as *fretorum*. Table 10 shows that there is a distinct difference in size between *lanioides* and *fretorum*. Adult females of *carnarvoni* are generally brownish or tawny above, not greyish, and perhaps buffier below than females of other subspecies and closely resemble their juveniles. Males of each subspecies are similar in coloration except possibly for more grey, less black, on the upper-tail coverts of *carnarvoni*. I agree with the splitting of this species into three subspecies though they are only weakly differentiated.

Myiagra ruficollis Broad-billed Flycatcher

In Australia, *M. ruficollis* ranges more or less continuously in mangroves between Whistle Creek (Frazier Downs) and Cape Grenville (eastern Cape York Peninsula), and in southern New Guinea between the Mimika and Laloki Rivers (Storr 1973, 1977, 1980; Rand and Gilliard 1967). A record from Noah Creek, near Cape Tribulation, north-eastern Queensland (Cowan 1977) requires confirmation.

All Australian and New Guinean populations are usually placed in the same subspecies (*mimikae*) because they are considered to be alike in size and coloration (Mayr 1941*b*; Keast 1958; Diegnan 1964; Storr 1973, 1977, 1980). However, birds fom the Aru Islands may be larger (Table 11) and a paler shade of rufous on the breast and throat. Unfortunately, the significance of the difference in coloration between birds from the Aru Islands and other populations of *mimikae* cannot be properly assessed because some adults from Melville Island and subadults in all populations are pale on the breast and throat. Some adults have no white edging on the outer vane of the outermost rectrices (*contra* Slater 1974).

Populations of *M. ruficollis* from the Celebes through to the Lesser Sunda Islands compose the nominate subspecies which is characterized by a rich rufous, almost chestnut, breast and throat and a slightly darker dorsum and face than *mimikae*. The subspecies *fluviventris* of Tanimbar Island is like nominate *ruficollis* on the throat and breast but is rufous rather than white on the abdomen, flanks, under-tail coverts and under-wing coverts, and has a greyish-blue rather than a glossy blackish-blue crown and a smaller patch of white below the eye.

Myiagra alecto Shining Flycatcher

The Shining Flycatcher is distributed along the northern fringe of Australia between Karratha and Noosa where it inhabits coastal mangroves and, less

commonly, sub-inland thickets and forests along freshwater streams. There are gaps in its range along the Eighty Mile Beach (between Port Hedland and Cygnet Bay, Dampier Land) and the Gulf of Carpentaria (between the Nicholson and Archer Rivers). It is widely distributed to the north of Australia, ranging between the Moluccas and Bismarcks.

Mayr (1941*a*) tentatively grouped all Australian populations under one subspecific name (*nitida*) but, as Keast (1958) and Galbraith (1974) showed, there is some differentiation between populations. In size of bill, Kimberley birds are narrowest and longest, Queensland birds widest and shortest, and Northern Territory birds are shorter than those in Queensland. In size of wing and bill, Queensland birds grade into those in New Guinea (Rand 1942; Storr 1973: Table 12). Mainly on these differences in size and some in coloration, Keast (1958) recognized three subspecies in Australia: *tormenti* in Kimberley, *nitida* in Northern Territory and *wardelli* in Queensland. Unfortunately all female specimens (AMNH) of *tormenti* examined by Keast were immatures (pers. obs.): adult females of *tormenti* have a glossy blue-black crown as in other forms, not a greyish one which is characteristic of juveniles in north-western Australia. There is also little geographic variation in belly colour of males (Galbraith 1974; *pace* Keast 1958). However, there are some clear-cut differences in coloration between females of north-western Australia (Kimberley and Northern Territory) and those of Queensland (Galbraith 1974; pers. obs.); for, the former are white or faintly buff on the under-tail coverts and white on the flanks whereas the latter are rufous to buff on the coverts and buff on the flanks. Additionally, first-years from north-western Australia are less glossy and more greyish, less blackish, on the crown. Apparently, therefore, some isolation exists between the two groups across the Gulf of Carpentaria. Storr (1973) used *rufolateralis* for north-western birds because *nitida* was preoccupied in *Myiagra* by *M. nitida* Gould, a synonym of *M. cyanoleuca*. However, *rufolateralis* (type locality Aru Islands) has a short bill (Table 12) and, in females, pale rufous under-tail coverts and ochraceous flanks. Females of the subspecies on Tanimbar Island, *longirostris*, have rufous under-tail coverts and flanks. Consequently, the next available subspecific name *melvillensis* Mathews must be used for the north-western group if it is to be treated as distinct from other populations. Therefore, two subspecies are accepted for Australia: *melvillensis* (Kimberley and Northern Territory) and *wardelli* (Queensland).

The subspecies *wardelli* of Queensland extends through the islands in Torres Strait to the Fly River lowlands of New Guinea where it intergrades with New Guinean populations in which females are dark chestnut (instead of very dark chestnut) on the dorsum and have the glossy black of the crown demarcated fairly sharply from (instead of merging gradually with) the rufous of the back (Mayr 1941*a*; Rand 1942; Rand and Gilliard 1967; pers. obs.). Populations characterized by a dark or very dark rufous back occur on the western Papuan islands, Geelvink Bay islands, Admiralty Islands and most of lowland New Guinea

(up to 300 m) except round Astrolabe Bay where they are apparently affected by gene flow from the pale-backed populations of the Bismarcks (cf. Mayr 1941*a*). The widespread New Guinean form and the populations of the Bismarcks are usually combined under *chalybeocephala* but if Bismarck birds are separated subspecifically they would be known as *chalybeocephala* (type locality New Ireland) and the New Guinea birds would be known as *novaeguineensis* (type locality Mimika River). Another subspecies, *lucida,* characterized by a large bill and very pale chestnut dorsum in females, occurs on the d'Entrecasteaux and Louisiade Archipelagoes.

The differences between juveniles and adult females are more pronounced in nominate *alecto* of the northern Moluccas and *melvillensis* than in *wardelli, novaeguineensis* and *chalybeocephala.* In the juvenile, *alecto* has a dull grey head sharply separated from the rufous back, *melvillensis* has a slightly glossy bluish head grading into the back and other forms have a fairly glossy blackish head. Interestingly, *alecto* has a dark rufous back and rufous under-tail coverts in females. Also noteworthy is that in female adults of *melvillensis* the dark crown is more sharply separated from the rufous back than in immatures; this may also be the case in other subspecies.

Rhipidura rufifrons Rufous Fantail

Two distinct subspecies occur in Australia: *dryas* in the northern coastal fringe between Yampi Peninsula (Wojulum) and the Watson River, western side of Cape York Peninsula, and *rufifrons* in coastal eastern Australia (Mayr and Moynihan 1946; Keast 1958; Galbraith 1974). Nominate *rufifrons* has a tail with the basal half rufous (Table 13) and narrow greyish to grey-white tips on the rectrices, slightly more prominent black-and-white scales on the breast, slightly more extensive rufous on the dorsum, flanks and under-tail coverts and slightly greyer sides of the breast; *dryas,* a tail with prominent white tips and little rufous (mostly concealed by the coverts) on the tail, reduced scaling on the breast, a greater tail to wing ratio and a longer bill (Keast 1958). Though essentially an inhabitant of mangroves, *dryas* sometimes frequents monsoon forest, gallery forest and dense riverside thickets. The chief habitats of *rufifrons* are rainforest and wet sclerophyll forest but it also commonly occurs in gallery forest, subhumid scrubs and waterside thickets particularly on migration.

Storr (1973) accepted a subspecies *intermedia* for populations in the north-eastern highlands of Queensland between Mt Amos and the Seaview Range; he stated that it was white-tipped on the tail and generally intermediate in coloration between *dryas* and *rufifrons* which he considered to have a breeding range south from the Bunya Mountains. Keast (1958) also considered birds from the Gulf of Carpentaria (e.g. Watson River) to be intermediate. As shown in Table 13, the pattern of coloration on the tail in breeding birds from north-eastern Queensland is like that of southern *rufifrons* whereas in birds from the Gulf country

(including Watson River) the pattern is as in *dryas*. Hence, there is no evidence for intergradation between *dryas* and *rufifrons*; indeed there is a wide gap between their breeding ranges and some of the inland records that have been attributed to *dryas* (e.g. Georgetown) by Storr (1973) were probably migrant *rufifrons*. However, there does appear to be a trend of increasing whiteness on the tip of the tail from south to north in breeding populations of *rufifrons* (including *intermedia*): northernmost birds have pale whitish-grey tips and southernmost, grey to buffy grey tips. Specimens from the Atherton Tableland can be matched with some from Mackay, Blackall Range, Bunya Mountains and Warwick but the trend is apparently clinal. Another character varying clinally in *rufifrons* is the colour of the face between the lores and auriculars and below the eyes: this is brown in southern birds and blackish (as in *dryas*) in northern breeding birds. There may also be some south-north clinal reduction of the degree of rufous on the flanks. Because *rufifrons* and *dryas* do not intergrade, the superficial resemblance of northern-breeding populations of *rufifrons* to *dryas* is a case of convergence. The form *intermedia* should not be recognized; only nominate *rufifrons* and *dryas* are accepted.

In New Guinea, *R. rufifrons* is only represented by four insular subspecies: *louisiadensis* in the Louisiade Archipelago (see Mayr 1941*a*), *squamata* in the western Papuan islands, *henrici* in the Aru Islands (plus Kai and South-east Islands of the Moluccas) and *streptophora* (in mangroves) in the Mimika River area of southern New Guinea (Mayr 1941*b*). The form *streptophora* is fairly similar to *dryas* in coloration (Ogilvie-Grant 1915; Table 13) but is longer tailed.

Gerygone tenebrosa Dusky Gerygone

This is the only species restricted to mangroves between Shark Bay (Bush Bay) and the southern Kimberley (Point Torment or possibly Kimbolton). It has gaps in range between Carnarvon and Yardie Creek and between Cape Keraudren and Whistle Creek (Frazier Downs). The mid-western and Pilbara populations appear to be similar in dimensions whereas the Kimberley population may be a trifle smaller in wing and tail length (*pace* Johnstone 1975; Table 14). The back is olive-grey in specimens from Bush Bay north to Dampier Land but at Point Torment it is dark greyish-brown, a trend towards the closely related *G. magnirostris*. This darkening on the dorsum may be caused by either local adaptation (ecotypy) or some hybridization with *magnirostris*. Interestingly, *tenebrosa* has black legs whereas *magnirostris* has slate grey legs but one dark specimen of *tenebrosa* (as judged on its cream irides and width of bill) has slate grey legs. The male specimen from Kunmunya (WAM) in the wet north-western Kimberley, identified by Johnstone (1975) as *tenebrosa* is peculiar; it supposedly had cream irides and black legs as in *tenebrosa*, but its bill width of 3.5 mm, dark olive-brown back and buffy breast and flanks identify it as *magnirostris*; its other measurements are wing 50, tail 40 and bill length 13.2 (cf. Tables 14 and 15). Hence, there is no absolute evidence for an overlap in the ranges of these species (*pace* Johnstone

1975): specimens of *tenebrosa* have been collected north to Point Torment and those of *magnirostris* south to Kimbolton (Trent River) but Johnstone (pers. comm.) has observed white-eyed gerygones, presumably *tenebrosa,* at Kimbolton.

Johnstone (1975) recognized three subspecies: nominate *tenebrosa* in southern Kimberley, *whitlocki* in the Pilbara and *christophori* in the mid-west. There is little difference between the latter two but *tenebrosa* appears to be smaller (Table 14) and perhaps darker than other populations. Hence, only two subspecies ought to be accepted: nominate *tenebrosa* for Kimberley populations and *christophori* for southern populations.

In classifying *tenebrosa* as a subspecies of *magnirostris,* Meise (1931) clearly believed these two taxa to be closely related. They have a generally dull coloration, faint superciliaries, white arcs above and below the eyes, darkish loral streaks and a weak, repetitive song, and replace each other geographically. They differ mainly in width of bill, ventral coloration (*magnirostris* is slightly buff rather than grey on the breast and flanks), coloration of irides (*magnirostris* is brick-red and *tenebrosa,* white) and nest construction (Johnstone 1975). McGill (1970) hinted that *tenebrosa* may be closer to *G. levigaster,* but this species is more strongly marked on the face and has a sweet, varied and sustained song more reminiscent of *G. fusca* (Ford 1981*c*). The peculiar specimen from Kunmunya also points to *tenebrosa* being closest to *magnirostris.*

Gerygone magnirostris Large-billed Gerygone

Three populations of *G. magnirostris* occur in Australia: north-western Kimberley between Kimbolton (Trent River) and Pago (Napier Broome Bay) including islands of the Bonaparte Archipelago; Northern Territory (including Melville Island, Groote Eylandt and Sir Edward Pellew Group) between the Daly and McArthur Rivers; and northern Queensland from Cape York south on the west coast to the Edward River and on the east coast to Mackay (and Shoalwater Bay?), including islands in Torres Strait and Hinchinbook Island. In the Kimberley, it has been seen only in mangroves; in the Northern Territory, mostly in mangroves, sometimes in adjacent monsoon and riverside forests; and in Queensland, in many sorts of dense vegetation overhanging water, where it penetrates inland along large rivers on Cape York Peninsula (e.g. middle Mitchell) and to lowland rainforest in north-eastern Queensland (Storr 1973, 1977, 1980). A record based on a clutch of eggs from the lower Nicholson River, Gulf of Carpentaria, reported by S.W. Jackson (Storr 1973), requires confirmation.

Meise (1931) placed the populations of the Northern Territory and Queensland in the same subspecies (nominate *magnirostris*); he did not have any material from the isolated population in north-western Kimberley. Table 15 indicates that all three populations are fairly similar in dimensions, though perhaps the Queensland population is slightly smaller in the wing and tail and more like those from southern New Guinea. Queensland birds appear to be the most strongly buff

below, and the Kimberley birds, particularly those from near the range of *G. tenebrosa,* the most whitish below. However, there is much individual variation and differentiation between the three populations is weak, so they are treated as one subspecies.

G. magnirostris is well distributed on lowlands up to about 1500 m in New Guinea and its satellite islands where it dwells in the same kinds of habitat as in Queensland (Rand and Gilliard 1967). Meise (1931) recognized eight subspecies (but omitted *hypoxantha* of Biak Island [see Mayr and de Schauensee 1939]), Mayr (1941*b*) ten, and Rand and Gilliard (1967) eleven; each had three subspecies on the mainland. The most distinctive forms occur on the remotest islands and those islands never connected to the mainland during the last glaciation: Biak (*hypoxantha*), Rossel (*rosseliana*) and Tagula (*tagulana*). As remarked by Rand and Gilliard (1967), the various subspecies have been described on the basis of slight differences in tone of the back (varying shades of olive-brown) and in the amount, depth and tone of wash on the undersurface (yellowish-buff to rusty-buff). They are all fairly similar in dimensions (Table 15). Populations on the mainland, Aru Islands and western Papuan Islands differ only slightly (Meise 1931; Rand 1942; pers. obs.); those in the Aru Islands and southern New Guinea, usually placed in *brunneipectus* and *mimikae* (which ought to be combined), are most like the Queensland population in coloration and size (Table 15) but Australian birds apparently have more white on the tips of the tail feathers.

Conopophila albogularis Rufous-banded Honeyeater

Salomonsen (1967) recognized two subspecies in this species, *albogularis* in the Northern Territory (between Port Keats and Roper River estuary, including Melville Island and Groote Eylandt) and Cape York Peninsula (between Cape York and the Staaten River), and *mimikae* in southern New Guinea (between Triton Bay and Port Moresby) and at the Sepik River and the Aru Island but stated that they were doubtfully distinct. Storr (1973) accepted Queensland birds as *yorki.* However, all populations are indistinguishable in coloration. Queensland and New Guinean birds are similar in size, and Northern Territory birds appear to have on average shorter bills than others (Table 16). Subspeciation, at the most, is slight. I accept no subspecies.

Conopophila contains two species, *albogularis* and *rufogularis,* which differ as follows: the throat is white in *albogularis,* rufous in *rufogularis*; the breast is rufous-brown in *albogularis,* grey in *rufogularis*; and the crown and frons are dark grey (unlike the back) in *albogularis,* grey-brown (like the back) in *rufogularis.* As *albogularis* is fairly widespread in New Guinea and has not colonized the Kimberley, it is presumably of New Guinean origin whereas *rufogularis* is confined to Australia where is probably evolved. Thus, these species may represent a case of speciation on opposite sides of Torres Strait-Arafura Sea.

Myzomela erythrocephala Red-headed Honeyeater

The Red-headed Honeyeater occurs in northern Australia continuously between Whistle Creek (Frazier Downs), Kimberley, and the Stewart River, eastern Cape York Peninsula, including continental islands, on islands in Torres Strait, in southern New Guinea between Hall Sound and Triton Bay, and on the Aru Islands. It inhabits mangroves and occasionally nearby thickets and gallery forest.

Specimens from Australia, southern islands of Torres Strait and Hall Sound region of New Guinea average shorter in wing, tail and bill than those from the Aru Islands, most of southern New Guinea and northern islands in Torres Strait (Table 17). However, the pattern of geographic variation in coloration is different: males from the Aru Islands, New Guinea excluding the Hall Sound area, Torres Strait islands and northern Cape York Peninsula are blackish on the dorsum and breast and brown on the abdomen; males from Hall Sound, Gulf of Carpentaria, and most of the Northern Territory and Kimberley are brownish on the dorsum and grey on the abdomen; and from the wet north-western Kimberley and Melville Island, intermediate. This explains why Mayr (1941*b*) and Salomonsen (1967) divided *M. erythrocephala* differently. Mayr (1941*b*) placed the populations in Australia, Torres Strait and south-eastern New Guinea in nominate *erythrocephala* and all others in *infuscata,* whereas Salomonsen also included the population on Cape York Peninsula in *infuscata.* The irregular distribution of dark birds and the discordance of size and coloration indicates that coloration might have partly been affected by climate and, therefore, should be given little weight in any subspecific divisions. Nevertheless, the darkening of birds on Cape York Peninsula might have been partly caused by gene flow from *infuscata* because Torres Strait birds are intermediate in size between *infuscata* and *erythrocephala.* Incidentally, *infuscata* Forbes is not a *nomen nudum* as suggested by Storr (1973) because Forbes (1879) clearly described how it differed from *erythrocephala.*

M. erythrocephala is not particularly close phylogenetically to *M. sanguinolenta* of coastal eastern Australia; for, each belongs to a different species-group within the *M. cardinalis* assemblage (Koopman 1957). The *erythrocephala*-group has no red on the back and abdomen whereas the *cardinalis*-group, which includes *sanguinolenta,* has red on the back. Within the *erythrocephala*-group, *M. adolphinae* of the central mountain-chain of New Guinea is most similar to *M. erythrocephala* in pattern of coloration and sexual dimorphism, though generally smaller and its female having a slight greenish tint dorsally; they presumably represent a Pleistocene speciation. Interestingly, some specimens of *adolphinae* have a trace of red extending from the rump on to the back, a characteristic of the *cardinalis*-group. Koopman (1957) suggested the *erythrocephala*-group probably arose somewhere in the Banda Sea (because this is where there are the most primitive species) and colonized New Guinea quite early in its history. The early New

Guinean form (proto-*adolphinae-erythrocephala*), presumably a rainforest-dweller, later invaded northern Australia where it gave rise to *M. erythrocephala* which colonized New Guinea, either by flying across the Arafura Sea-Torres Strait or by utilizing one of the Pleistocene land bridges over Torres Strait. The occurrence of an isolated population of nominate *erythrocephala* in south-eastern New Guinea and the apparent secondary contact between *erythrocephala* and *infuscata* on islands in Torres Strait underline a complex history of expansions and contractions in the range of *M. erythrocephala* stock. *M. erythrocephala* has also crossed the Timor-Arafura sea and colonized Sumba, where it has produced the distinctive *M. [e.] dammermani,* a slightly melanistic and smaller form. Presumably Salomonsen (1967) treated *M. kuehni* of Wetar Island as specifically distinct from *M. erythrocephala* because it is monochromatic, it has ventral red on the throat and upper breast (rather than confined to the throat as in *erythrocephala*) and its general coloration is drab like the female of *erythrocephala.*

Zosterops lutea Yellow Silvereye

This species occurs plentifully between Shark Bay and the Edward River, western Cape York Peninsula (Mees 1961, 1969; Storr 1973, 1977, 1980), and less commonly between Cairns and Ayr, north-eastern Queensland (Galbraith 1967; Lavery and Grimes 1974) and possibly around Quintell Beach, eastern side of Cape York Peninsula (Johnson and Hooper 1973). Mees (1961, 1969) divided populations in north-western Australia into two subspecies: *balstoni* between Shark Bay and the western Kimberley and *lutea* between the northern Kimberley and the Edward River. He distinguished *lutea* from *balstoni* by its supposedly larger size and slightly brighter, more yellowish coloration. However, variation in size of wing and bill appears to be clinal (Table 18) and many specimens from within the range of *balstoni* in western Kimberley are just as bright and yellow as those from northern Australia. Moreover, individual variation is such that the dullest (or brightest) birds in any population can be matched with those in other populations, and specimens in old plumage are duller and more greenish than those in new plumage. Specimens of the eastern coastal population collected by Lavery and Grimes (1974) were assessed as similar in size and coloration to specimens from the Gulf of Carpentaria. Consequently, there appears to be no subspeciation in *Z. lutea.*

The relationships of *Z. lutea* are unclear. *Z. flava, Z. griseotincta, Z. natalis* and *Z. chloris* (including *citrinella* and *albiventris*) are considered to be phylogenetically closest to *Z. lutea* (Stresemann 1931; Mayr 1944*a*, 1965; Mees 1957, 1961). *Z. flava* is smaller and more yellowish than *Z. lutea,* does not have a black loral spot and has a continuous white eye-rim (not one with a slight gap caused by a black loral spot as in *lutea*); it, therefore, does not appear to be particularly close to *Z. lutea. Zosterops natalis* is light greyish-white below, pale buff on the flanks, dull green above, larger and heavier-billed and has more black on the lore and below the eye than *Z. lutea*; consequently, it also appears not to be specially close

but is probably closer than *Z. flava. Zosterops griseotincta* is larger, more greenish below, greyish and green on the loral area, larger billed, brown rather than black in bill coloration and without yellow on the frons. The last species, *Z. chloris,* is quite like *Z. lutea* in pattern and coloration round the eye, fairly similar in size and pale yellow on the frons; undoubtedly it is the most closely related to *Z. lutea.* Indeed, Mayr (1944*a,* 1965) considered them conspecific but the parapatric occurrence of *Z. c. albiventris* on small wooded islands off the east coast of Cape York Peninsula and *Z. lutea* in patches of mangroves on the adjacent mainland suggests they are allospecifically related. Within *Z. chloris,* there are two very distinct groups: the yellow-bellied or *chloris*-group of the Moluccas, Celebes, Flores to Bali and Java Sea islands, and the white-bellied or *citrinella-albiventris*-group of Sumba, Lesser Sunda Islands, and islands of south-eastern Banda Sea, Torres Strait and Great Barrier Reef (off coast of eastern Cape York Peninsula). Mees (1957, 1961) initially treated these groups as conspecific but later (1969) as specifically distinct. Strangely, the white-bellied group lies geographically between the yellow-bellied group and *lutea* which, of course, is yellow below. Both *chloris-citrinella* and *lutea* are inhabitants of mangroves, small well-wooded islands and thickets on lowlands of mainlands or large islands but *chloris* ascends to higher altitudes (Mayr 1944). The ancestral home of the form that produced the trichotomy *chloris-citrinella-lutea* is obscure and hence whether north-western Australia was invaded from the Lesser Sundas-southern Moluccan region or vice versa cannot be stated with confidence. However, the extensive distribution of *Z. chloris-citrinella* possibly indicates that it is a fairly old species that has expanded its range since the last glacio-eustatic rise in sea level (Mees 1961). Probably, therefore, *Z. lutea* is the younger form.

Cracticus quoyi Black Butcherbird

Widespread in lowland forests in New Guinea, including several western islands (Misol, Salawati, Waigeu and Japen) and the Aru Islands, this species has four isolated populations in Australia (Melville Island plus coastal Northern Territory between Port Keats and the Goyder River, northern Cape York Peninsula south to the Archer and Stewart River, humid north-eastern Queensland between the Endeavour and Herbert Rivers and inland to the eastern Atherton Tableland, and northern central-coastal Queensland between Proserpine (Thompsons Creek) and Port Clinton. Amadon (1951), the last reviser, recognized a long and slender-billed, long-winged subspecies *spaldingi* in the Northern Territory, northern Cape York Peninsula and Aru Islands, a bulbous-billed subspecies *quoyi* in New Guinea and its western satellite islands, and a short-winged, dimorphic (a rufous as well as a black juvenile phase) subspecies *rufescens* in eastern Queensland. Storr (1973) considered the northern Cape York Peninsula population to belong to *quoyi* and the central Queensland population (apart from being monophasic) to be unknown taxonomically. Mees (1964) gave data indicating the population between Merauke and Daru, southern New Guinea, to be part of *spaldingi.*

Apart from the rufous morph in north-eastern Queensland, birds of all populations are similarly black. Table 19 summarizes measurements of all populations. It confirms that Northern Territory birds average the longest in bill, wing and tail but are narrow-billed and that Daru-Merauke birds average longer in wing than other New Guinean birds. However, the table also shows that Aru Island birds are approximately intermediate in dimensions between Northern Territory and New Guinea birds and that birds of the three Queensland populations are fairly similar in dimensions yet smaller than those from elsewhere. When size and coloration are simultaneously considered it is apparent that most populations have differentiated from one another. Nothing is achieved by expressing this subspecifically.

Table 1 Measurements (mm) of *Eulabeornis castaneoventris*.

Population	Males	Females
Wing Length		
Aru Islands		210
Melville I. and N.T.	214, 219(2)	207, 216, 218
Kimberley	209(2), 210(2), 211, 212, 214, 217, 219, 243	194, 200, 205, 206, 218, 220, 223
Cape York Peninsula	223	
Entire Bill Length		
Aru Islands		57
Melville I. and N.T.	59, 63.5, 64, 65	56.5, 57, 58.5
Kimberley	56, 60(5), 61, 62.5, 63, 63.5, 64.5	56, 56.5, 57.5, 59, 61, 62.5, 63
Cape York Peninsula	60	
Tail Length		
Aru Islands		121
Melville I. and N.T.	126, 127, 135	120(2), 130
Kimberley	122, 126, 127, 129, 132, 133	114, 121, 124, 127, 130(2)
Cape York Peninsula	128	
Tarsus Length		
Aru Islands		67.5
Melville I. and N.T.	67(2), 68.5, 76	67, 70.5, 73
Kimberley	61.5, 67, 69, 70, 70.5, 71.5	66, 68, 68.5, 69, 70(2), 71.5
Cape York Peninsula	74	

Table 2 Measurements (mm) of *Halcyon chloris sordida*

Population	Males	Females	Unsexed
Bill Length			
Aru Islands	51, 54.5, 55.5, 56(2), 56.5, 58.5	57, 59, 60.5	
New Guinea	54, 54.5, 57(2)	53, 55	
Pilbara	55.5	54	
Kimberley	60, 61.5	53.5	
Northern Territory	55, 55.5, 56(2), 57.5, 58(2), 59	55.5, 57*, 58.5, 59, 60	56, 58
Eastern Queensland	52, 54, 55(2), 56.5, 57.5, 58(3), 59(2), 59.4	55(2), 56, 57, 59	52, 52.5(3), 53(2), 56, 58, 59.5
Wing Length			
Aru Islands	100, 106, 115	103, 104, 107	
New Guinea	103, 107, 108, 110, 112	101, 104, 105	
Pilbara	95	91	
Kimberley	106(2)	104	
Northern Territory	97, 100(2), 100.5, 102(2), 104.5	94*, 98, 99, 101, 103	97, 99
Eastern Queensland	101.5, 102.5, 103(2), 104(2), 106, 107(2), 107.5, 108, 112, 114	99, 103(2), 106, 110, 115	103, 104(3), 105(2), 108.5(2)
Tail Length			
Aru Islands	71.5, 72, 72.5	71, 76	
New Guinea	67, 68, 71	68, 70	
Pilbara	67.5	67.5	
Kimberley	72, 76	73.5	
Northern Territory	70, 71(3)	66*, 68.5, 69(2), 70, 72(2)	66.5, 70(2), 72
Eastern Queensland	66, 67, 68, 69(2), 70(2), 70.5, 71, 72(2)	67, 69(2), 70, 75	64.5, 65, 66(2), 67, 68, 69, 69.5, 70.5

*Subadult

Table 3 Measurements (mm) of *Alcedo pusilla*.

Population	Males				Females			
	No.	Mean	Range	S.D.	No.	Mean	Range	S.D.
Bill Length								
Northern Territory	10	32.1	29.9-34.2	1.28	5	32.4	31.3-33.3	0.80
Cape York Peninsula	12	32.8	29.2-35.0	1.73	4	32.0	31.5-32.2	0.31
North-east Queensland	16	33.7	30.7-35.8	1.13	11	32.3	29.2-34.7	1.99
South New Guinea	8	32.9	32.0-34.0	0.73	7	31.1	30.0-32.0	0.71
Wing Length								
Northern Territory	10	50.8	49.0-52.5	1.16	5	51.6	50.5-52.0	0.65
Cape York Peninsula	12	51.3	50.5-52.0	0.69	4	52.1	51.0-53.0	0.85
North-east Queensland	16	53.8	52.0-57.0	1.30	11	52.5	50.0-53.5	1.04
South New Guinea	8	50.3	49.0-51.0	0.70	7	51.5	50.0-54.0	1.32
Tail Length								
Northern Territory	7	22.1	20.0-24.0	1.62	5	22.3	21.5-23.5	0.76
Cape York Peninsula	8	21.2	20.0-24.0	1.62	2	22.0	21.0-23.0	
North-east Queensland	16	23.0	22.0-24.0	0.64	11	22.6	21.5-23.5	0.55
South New Guinea	5	20.6	20.0-21.0	0.42	5	21.9	21.0-22.5	0.55

Table 4 Measurements (mm) of *Microeca tormenti* and *M. f. flavigaster*.

Character	Males				Females			
	No.	Mean	Range	S.D.	No.	Mean	Range	S.D.
Wing Length								
tormenti	13	74.3	73.5-76.5	1.05	12	71.9	70.0-74.0	1.37
flavigaster	14	72.1	69.5-77.5	1.95	9	69.2	68.0-72.0	1.30
Tail Length								
tormenti	13	57.9	56.0-61.5	1.62	12	56.7	53.5-59.0	1.50
flavigaster	14	54.0	51.0-56.0	1.35	9	53.3	51.5-55.0	1.18
Bill Length								
tormenti	13	14.3	14.0-14.9	0.29	10	14.1	13.6-14.3	0.37
flavigaster	12	13.1	12.8-13.9	0.29	9	12.7	12.3-13.5	0.40
Bill Width								
tormenti	12	5.1	5.0-5.4	0.15	12	5.1	4.9-5.3	0.13
flavigaster	13	5.3	5.0-5.7	0.21	8	5.2	4.8-5.5	0.23
Tarsus Length								
tormenti	12	15.5	14.9-16.2	0.45	12	15.0	14.7-15.4	0.27
flavigaster	14	14.1	13.6-14.5	0.22	9	14.0	13.5-14.5	0.37

Table 5 Measurements (mm) of *Eopsaltria pulverulenta*.

Population	Males				Females			
	No.	Mean	Range	S.D.	No.	Mean	Range	S.D.
Wing Length								
Pilbara	5	83.6	82.5-85.0	1.08	6	78.8	76.5-81.0	1.69
Kimberley*	24	82.0	77.0-85.5	2.20	22	77.2	74.0-81.0	1.77
Northern Territory	8	85.9	84.5-90.5	2.23	15	80.1	76.0-86.0	2.58
Karumba	12	84.9	82.0-88.0	1.78	8	79.8	77.0-81.0	1.31
Cape York Peninsula	3	86.5	86.0-87.5	0.87	4	79.5	79.0-81.0	1.00
North-east Queensland	1	89.5			5	79.2	77.5-80.5	1.48
New Guinea	1	89.5			2	79.0	79.0-79.0	
Tail Length								
Pilbara	5	63.4	62.0-65.5	1.39	6	59.6	58.0-61.0	1.20
Kimberley*	23	63.6	58.5-67.5	2.26	21	59.4	57.0-63.5	1.87
Northern Territory	8	66.3	64.0-70.0	1.85	15	62.8	58.5-67.0	2.67
Karumba	12	67.9	65.0-70.0	1.76	8	62.6	59.0-68.5	3.03
Cape York Peninsula	3	67.7	66.0-68.5	1.44	4	62.8	60.5-64.0	1.85
North-east Queensland	1	68.5			5	60.6	58.0-63.5	2.53
New Guinea	1	68.5			2	63.0	63.0-63.0	
Bill Length								
Pilbara	5	21.4	20.2-22.4	0.80	6	19.2	18.7-19.9	0.56
Kimberley*	23	20.5	19.9-21.2	0.41	18	18.3	17.7-19.1	0.46
Northern Territory	7	19.8	18.7-21.2	0.95	14	18.3	17.4-20.2	0.90
Karumba	13	19.6	19.1-20.7	0.53	7	17.6	17.2-18.7	0.53
Cape York Peninsula	3	19.5	19.2-20.1	0.52	4	17.3	17.0-17.4	0.20
North-east Queensland	2	19.5	19.3-19.6		4	17.5	17.0-18.0	0.53
New Guinea	1	18.8			3	17.1	17.0-17.2	0.10

* Excludes Cambridge Gulf.

Table 6 Variation in coloration of *Eopsaltria pulverulenta*.

Population	Crown			Auriculars		
	Grey	Intermediate	Blackish	Grey	Intermediate	Black
Pilbara	11	0	0	6	5	0
Kimberley	49	0	0	27	22	0
Northern Territory	4	15	4	0	6	16
Kurumba	12	3	0	6	15	0
Cape York	3	4	0	1	5	1
North-east Queensland	5	2	0	4	4	0
New Guinea	4	0	0	4	0	0

Table 7 Hybridization between *melanura* and *spinicauda* in Kimberley.

Locality	No. of Females				
	Melanura	Hybrid Score			*spinicauda*
	0	1	2	3	4
St George Inlet	3				
Port Warrender	3	1	2		
Napier Broome Bay		1		1	1
Cambridge Gulf					6

Table 8 Measurements (mm) of *Pachycephala melanura*.

Locality	Males				Females			
	No.	Mean	Range	S.D.	No.	Mean	Range	S.D.
Wing Length								
Pilbara	7	83.6	81.0-86.0	1.72	7	80.4	79.0-82.0	0.98
South Kimberley	30	80.4	79.0-83.0	1.15	28	79.0	77.0-83.0	1.56
North Kimberley	10	81.4	79.0-84.5	1.84	9	79.3	77.0-82.0	2.19
Northern Territory	12	83.8	81.0-86.5	1.59	8	82.3	78.5-85.5	2.10
Gulf-Cape York	12	87.3	83.0-92.0	2.86	10	83.4	82.0-85.0	1.13
New Guinea	6	91.7	87.0-96.0	2.99	4	89.0	87.0-91.0	1.83
Bismarcks	2	89.5	88.0-91.0		1	92.0		
Tail Length								
Pilbara	7	68.9	69.0-70.0	0.75	7	67.7	66.5-70.0	1.22
South Kimberley	29	65.0	62.0-69.0	1.46	28	64.5	62.0-67.5	1.33
North Kimberley	11	64.9	61.0-70.0	2.54	8	65.1	62.5-68.0	2.70
Northern Territory	12	67.4	65.0-72.0	2.12	10	67.4	65.0-73.0	2.53
Gulf-Cape York	13	69.7	67.5-71.5	1.53	9	66.6	65.5-68.5	1.08
New Guinea	6	70.3	69.0-72.5	1.47	5	69.0	66.5-70.0	1.54
Bismarcks	2	68.5	66.0-71.0		1	69.0		
Bill Length								
Pilbara	7	18.6	17.5-19.4	0.60	5	18.0	17.9-18.1	0.10
South Kimberley	29	18.6	18.1-19.4	0.39	30	18.1	17.1-19.8	0.70
North Kimberley	10	18.5	17.8-19.1	0.36	9	18.5	17.9-19.2	0.52
Northern Territory	14	18.4	17.8-20.0	0.59	9	18.1	17.6-19.0	0.47
Gulf-Cape York	17	19.2	18.6-20.6	0.74	10	18.7	18.3-19.4	0.37
New Guinea	4	20.6	19.5-20.4	1.27	2	20.7	19.1-22.2	
Bismarcks	2	19.8	18.8-20.7		1	20.0		

Table 9 Measurements (mm) specimens of *Pachycephala simplex*.

Subspecies	Males				Females			
	No.	Mean	Range	S.D.	No.	Mean	Range	S.D.
Wing Length								
peninsulae	14	77.2	73.5-81.0	1.86	17	74.8	72.5-77.5	1.49
simplex	12	75.3	73.0-76.0	0.96	12	72.5	68.0-74.5	1.66
Tail Length								
peninsulae	15	60.6	57.5-62.0	1.80	19	60.0	57.0-63.0	1.72
simplex	12	59.1	57.0-60.5	1.09	10	57.2	56.0-58.5	0.82
Bill Length								
peninsulae	14	15.5	15.1-16.2	0.35	18	15.3	14.8-15.7	0.37
simplex	12	16.3	15.6-17.4	0.53	12	16.3	15.8-16.9	0.33

Table 10 Measurements (mm) of *Pachycephala lanioides*.

Population	Males				Females			
	No.	Mean	Range	S.D.	No.	Mean	Range	S.D.
Wing Length								
Mid-Western Australia	1	99.0			7	97.3	95.0-102	2.50
Pilbara	24	99.6	96.0-104.5	2.00	10	99.4	97.0-101	1.22
Kimberley	30	99.4	95.5-103	2.04	25	97.2	94.0-99.0	1.61
Wyndham	4	94.9	94.0-96.5	1.18	3	92.5	92.0-93.0	0.50
Northern Territory	14	95.1	91.0-99.0	2.32	10	92.7	90.0-94.0	1.60
North-west Queensland	3	96.0	94.0-99.0	2.65	8	92.4	90.5-94.0	1.55
Tail Length								
Mid-Western Australia	1	79.5			7	79.0	77.0-83.0	2.29
Pilbara	24	80.4	77.0-85.0	2.34	13	81.5	75.0-84.0	3.07
Kimberley	29	80.4	77.0-87.0	2.05	26	79.7	75.0-85.0	2.18
Wyndham	4	75.5	73.0-78.0	2.26	3	76.5	75.5-76.5	1.00
Northern Territory	13	75.5	71.5-80.5	2.85	9	75.5	73.0-77.5	1.90
North-west Queensland	2	76.5	74.0-79.0	3.54	8	76.5	74.0-81.0	2.63
Bill Length								
Mid-Western Australia	1	26.3			6	24.8	24.3-25.6	0.46
Pilbara	23	25.2	23.5-27.4	0.87	13	25.4	24.5-26.9	0.73
Kimberley	29	25.0	23.9-26.2	0.65	27	24.6	22.0-26.6	1.06
Wyndham	4	23.4	22.6-24.4	0.79	3	23.1	22.7-23.7	0.51
Northern Territory	14	23.3	22.0-25.1	0.93	9	23.2	22.2-24.0	0.54
North-west Queensland	3	23.9	22.8-25.2	1.21	8	22.7	22.0-23.6	0.67

Table 11 Measurements (mm) of *Myiagra ruficollis mimikae*.

Population	Males				Females			
	No.	Mean	Range	S.D.	No.	Mean	Range	S.D.
Wing Length								
Kimberley	19	69.6	68.0-72.0	1.35	10	66.6	65.0-68.0	1.29
Northern Territory	5	71.2	70.0-73.5	1.80	4	70.0	69.0-72.5	1.68
Cape York Peninsula	7	72.0	70.5-74.0	1.63	6	70.3	68.0-71.0	1.13
Aru Islands	2	76.8	76.5-77.0					
New Guinea	2	75.3	72.5-75.0		1	70.0		
Bill Length								
Kimberley	19	17.4	16.8-18.3	0.56	10	16.9	15.4-17.9	0.70
Northern Territory	5	18.2	17.8-18.8	0.40	7	17.9	17.4-18.7	0.48
Cape York Peninsula	7	17.9	17.0-18.5	0.52	9	18.2	17.3-18.8	0.47
Aru Islands	2	17.8	17.5-18.1					
New Guinea	1	17.8			1	18.0		
Bill Width								
Kimberley	19	7.1	6.8-7.4	0.19	10	7.2	6.8-7.5	0.21
Northern Territory	4	7.2	7.0-7.5	0.24	7	7.2	6.9-7.6	0.22
Cape York Peninsula	8	7.1	6.8-7.4	0.22	8	7.0	6.7-7.6	0.29
Aru Islands	2	7.4	7.3-7.5					
New Guinea	1	7.2			1	7.4		
Tail Length								
Kimberley	19	69.2	67.0-73.0	1.69	10	67.7	66.0-70.5	1.40
Northern Territory	5	71.0	68.5-75.5	2.76	7	70.5	69.0-75.5	1.04
Cape York Peninsula	8	72.1	69.0-77.0	2.72	9	70.5	67.0-73.0	1.97
Aru Islands	2	75.3	74.0-76.5					
New Guinea	1	73.0			1	73.0		

Table 12 Measurements (mm) of *Myiagra alecto*.

Population	Males				Females			
	No.	Mean	Range	S.D.	No.	Mean	Range	S.D.
Bill Length								
Kimberley	12	22.4	21.0-23.2	0.66	24	22.4	20.6-24.1	0.90
Northern Territory	12	21.7	20.6-22.4	0.57	16	21.2	20.5-22.1	0.47
Queensland	15	20.2	19.2-21.4	0.73	15	20.0	18.3-21.2	0.84
Daru	8	20.6	19.6-21.6	0.66	7	20.1	19.5-20.9	0.46
Upper Fly	14	20.7	19.5-21.8	0.62	7	20.1	18.8-20.8	0.46
Aru Islands	5	19.6	19.3-20.4	0.47	2	19.1	18.5-19.6	0.78
Tanimbar	5	21.7	21.2-22.2	0.38	4	21.4	21.0-21.8	0.37
Bill Width								
Kimberley	12	5.0	4.7-5.3	0.19	23	5.0	4.7-5.2	0.16
Northern Territory	14	5.2	4.6-5.8	0.29	16	5.1	4.4-5.6	0.27
Queensland	13	5.5	5.1-5.8	0.24	14	5.6	5.1-5.8	0.22
Daru	6	6.0	5.6-6.3	0.29	11	5.8	5.3-6.2	0.30
Upper Fly	15	5.9	5.7-6.4	0.25	9	5.7	5.3-6.2	0.24
Aru Islands	4	5.3	4.9-5.5	0.28	3	5.6	5.1-5.9	0.44
Tanimbar	5	5.3	5.2-5.6	0.17	4	5.7	5.5-5.8	0.17
Wing Length								
Kimberley	12	85.4	83.5-88.0	1.54	18	80.4	76.5-84.0	2.32
Northern Territory	15	85.5	83.5-88.0	1.41	14	80.9	79.0-84.5	2.60
Queensland	16	86.8	83.5-91.0	1.99	14	82.3	79.5-85.5	1.81
Daru	8	89.3	87.0-91.5	1.83	8	84.4	82.0-89.0	2.37
Upper Fly	15	86.9	84.0-92.0	2.33	8	83.6	82.0-86.5	1.64
Aru Islands	4	88.6	86.0-92.0	2.69	3	83.0	82.0-83.5	0.87
Tanimbar	5	85.3	94.5-87.0	0.97	4	81.5	80.0-83.0	1.29
Tail Length								
Kimberley	12	78.4	75.5-83.5	2.27	19	75.7	73.5-79.0	2.19
Northern Territory	15	78.5	76.0-81.5	1.56	14	76.0	73.0-79.0	2.00
Queensland	16	77.5	73.5-82.0	2.24	14	75.2	71.0-80.0	2.89
Daru	8	81.4	79.0-85.0	2.99	8	76.9	72.5-80.5	2.60
Upper Fly	15	77.3	73.0-81.5	2.67	8	75.4	73.0-80.0	2.18
Aru Islands	5	82.3	80.0-85.0	1.99	4	79.5	78.5-82.0	1.68
Tanimbar	4	78.8	76.0-83.5	3.28	3	76.3	73.5-80.0	3.33

Table 13 Measurements (mm) of adult specimens of *Rhipidura rufifrons*.

Population	Males				Females			
	No.	Mean	Range	S.D.	No.	Mean	Range	S.D.
Wing Length								
Victoria	13	72.9	68-77	2.6	3	70.3	69-71	1.2
New South Wales	5	72.6	71-55	1.6	2	72.8	72-74	
South Queensland	5	75.8	73-78	2.2				
North-east Queensland	5	73.5	71-76	2.0	1	72.0		
Gulf of Carpentaria	9	69.0	67-71	1.3	4	68.3	67-71	1.6
Northern Territory	9	69.7	66-73	3.2	6	68.8	67-72	2.0
Kimberley	3	69.0	66-71	2.7	1	67.0		
Mimika River	3	75.8	75-77	0.8	1	74.0		
Tail length								
Victoria	13	84.6	79-90	3.3	3	82.3	79-85	3.4
New South Wales	5	85.4	82-89	3.4	2	83.5	81-86	
South Queensland	5	90.0	88-93	2.3				
North-east Queensland	5	87.9	83-93	4.6	1	90.5		
Gulf of Carpentaria	9	90.3	87-95	2.6	4	90.0	86-92	2.8
Northern Territory	9	92.1	87-97	3.6	5	90.8	86-93	3.7
Kimberley	2	91.8	91-93		1	87.5		
Mimika River	3	89.0	84-96	6.2	1	91.0		

Table 13 (continued)

Population	Males				Females			
	No.	Mean	Range	S.D.	No.	Mean	Range	S.D.
Rufous Base*								
Victoria	13	45.2	42-52	3.4	3	43.3	43-44	0.6
New South Wales	5	45.6	43-50	2.5	2	43.0	43-43	
South Queensland	5	47.8	43-52	3.5				
North-east Queensland	5	45.8	42-48	2.4	1	47.0		
Gulf of Carpentaria	9	20.7	18-26	2.7	4	21.0	20-23	1.4
Northern Territory	9	22.9	20-25	1.9	1	17.0		
Kimberley	2	22.5	21-24		1	19.5		
Mimika River	2	19.0	18-20		1	21.5		
Pale Tip**								
Victoria	13	8.5	8-10	1.1	3	8.7	8-10	1.2
New South Wales	5	9.2	7-11	1.8	2	8.0	8-8	
South Queensland	5	10.2	9-11	0.8				
North-east Queensland	5	10.2	10-11	0.5	1	10.0		
Gulf of Carpentaria	8	18.9	17-23	2.4	3	19.0	18-20	1.0
Northern Territory	9	20.6	13-23	3.3	1	23.5		
Kimberley	3	20.7	20-21	0.6	1	23.0		
Mimika River	2	17.0	15-19		1	16.0		

* Measured along rachis on outer vane of central rectrix

** Grey in *rufifrons*, white in *dryas* and *streptophora*.
Length of tip measured on inner vane of second outmost rectrix.

Table 14 Measurements (mm) of *Gerygone tenebrosa*.

Population	Males				Females			
	No.	Mean	Range	S.D.	No.	Mean	Range	S.D.
Bill Length								
Mid-Western Australia	10	14.2	13.6-14.8	0.37	5	13.8	13.4-14.1	0.31
Pilbara	21	14.1	13.2-15.0	0.43	21	13.9	13.2-14.6	0.43
Kimberley	20	14.0	13.0-14.8	0.45	14	13.6	13.2-14.1	0.27
Bill Width								
Mid-Western Australia	10	3.1	2.8-3.3	0.16	6	2.9	2.8-2.9	0.05
Pilbara	21	2.9	2.7-3.2	0.12	19	2.9	2.7-3.3	0.16
Kimberley	21	3.0	2.7-3.2	0.16	15	3.0	2.8-3.2	0.14
Wing Length								
Mid-Western Australia	10	56.8	54.0-59.5	1.86	7	55.9	55.0-56.5	0.45
Pilbara	22	57.8	54.5-61.0	2.05	20	55.9	54.0-59.0	1.53
Kimberley	21	55.1	53.0-57.0	1.26	15	52.7	50.0-55.0	1.33
Tail length								
Mid-Western Australia	10	45.7	42.5-48.0	2.08	7	45.1	44.0-46.0	0.63
Pilbara	23	47.1	42.5-50.0	2.01	20	45.9	42.0-48.5	1.55
Kimberley	21	44.3	42.0-48.0	1.67	15	42.4	40.0-45.0	1.54

Table 15 Measurements (mm) of *Gerygone magnirostris*.

Population	Males				Females			
	No.	Mean	Range	S.D.	No.	Mean	Range	S.D.
Bill Length								
Kimberley	15	13.4	12.9-14.2	0.43	6	13.1	12.3-13.8	0.53
Northern Territory	15	13.5	13.0-14.2	0.42	10	12.9	12.3-13.4	0.40
North Queensland	12	13.2	12.7-13.8	0.32	17	12.8	12.2-13.3	0.33
South New Guinea	21	13.0	12.2-14.2	0.36	12	12.9	12.0-14.0	0.51
North New Guinea	30	13.3	12.4-14.2	0.47	22	13.3	12.6-14.0	0.39
Bill Width								
Kimberley	17	3.6	2.4-3.8	0.15	7	3.7	3.4-3.9	0.16
Northern Territory	16	3.7	3.5-4.0	0.14	10	3.6	3.5-3.9	0.16
North Queensland	13	3.5	3.3-3.9	0.17	17	3.6	3.3-3.8	0.16
South New Guinea	23	3.7	3.4-3.9	0.17	14	3.7	3.5-4.1	0.17
North New Guinea	30	3.7	3.3-4.0	0.17	21	3.7	3.2-4.0	0.18
Wing Length								
Kimberley	17	55.2	52.0-57.5	1.68	7	52.7	52.0-56.0	1.47
Northern Territory	16	56.6	55.0-58.0	0.93	10	53.5	51.0-55.0	1.27
North Queensland	13	54.6	51.5-57.0	1.89	17	53.7	51.0-56.5	1.73
South New Guinea	24	54.3	51.0-57.0	1.49	14	52.3	50.0-54.0	1.20
North New Guinea	31	55.8	52.0-58.0	1.73	22	52.8	50.5-54.5	1.12
Tail Length								
Kimberley	17	44.9	43.0-47.0	1.09	7	42.5	40.0-46.0	2.29
Northern Territory	15	44.9	41.0-46.5	1.45	10	42.2	40.0-45.5	1.69
North Queensland	13	42.5	38.0-45.5	2.30	17	41.4	38.0-44.5	1.52
South New Guinea	24	41.7	39.5-45.5	1.44	13	40.2	39.0-42.0	1.18
North New Guinea	30	42.8	40.5-46.0	1.37	19	41.0	39.5-43.0	1.21

Table 16 Measurements (mm) of *Conopophila albogularis*.

Population	Males				Females			
	No.	Mean	Range	S.D.	No.	Mean	Range	S.D.
Wing Length								
New Guinea	11	66.5	63.0-68.5	1.59	11	63.5	61.0-65.5	1.52
Northern Territory	18	66.4	65.0-69.0	0.97	8	64.1	62.0-66.5	1.53
Cape York Peninsula	2	68.5	66.0-71.0		2	65.0	64.0-66.0	
Tail Length								
New Guinea	10	46.7	44.0-50.0	1.72	11	44.6	43.0-46.5	1.45
Northern Territory	18	46.9	44.0-49.0	1.38	8	45.6	43.0-47.0	1.38
Cape York Peninsula	2	47.0	45.0-49.0		3	44.0	43.0-45.0	1.00
Bill Length								
New Guinea	10	16.2	15.4-16.8	0.51	11	15.6	15.0-16.2	0.33
Northern Territory	17	15.4	14.6-16.3	0.46	7	14.7	14.1-15.7	0.53
Cape York Peninsula	2	16.5	16.2-16.7		3	15.2	15.0-15.4	0.21

Table 17 Measurements (mm) of *Myzomela erythrocephala*.

Population	Males				Females			
	No.	Mean	Range	S.D.	No.	Mean	Range	S.D.
Wing Length								
Kimberley	32	58.7	57.0-61.0	1.24	17	55.3	53.5-57.0	1.02
N.T.-Gulf of Carpentaria	22	58.9	57.5-60.0	0.86	16	55.5	53.0-59.0	1.61
Cape York Peninsula	16	59.3	57.0-62.0	1.36	7	55.2	54.0-56.5	1.11
New Guinea	12	61.6	60.5-63.5	0.85	4	57.4	55.5-59.0	1.44
Hall Sound	2	59.0	59.0-59.0					
Tail Length								
Kimberley	18	41.6	40.0-43.5	0.95	14	39.2	36.5-41.0	1.33
N.T.-Gulf of Carpentaria	22	42.4	41.0-44.5	1.01	15	38.9	36.5-42.5	1.62
Cape York Peninsula	17	42.0	39.5-44.5	1.32	6	38.9	38.0-40.0	0.74
New Guinea	12	45.0	43.0-48.5	1.48	4	41.6	40.0-44.5	2.02
Hall Sound	2	41.5	41.0-42.0					
Bill Length								
Kimberley	30	16.6	16.0-17.7	0.49	14	15.9	15.2-16.5	0.41
N.T.-Gulf of Carpentaria	21	16.9	16.2-17.3	0.35	13	15.9	15.4-16.7	0.37
Cape York Peninsula	12	16.9	16.2-17.3	0.36	7	16.2	15.7-16.7	0.34
New Guinea	12	18.7	18.1-19.0	0.49	4	16.9	16.3-17.4	0.47
Hall Sound	2	17.0	16.2-17.8					

Table 18 Measurements (mm) of *Zosterops lutea*.

Population	Males				Females			
	No.	Mean	Range	S.D.	No.	Mean	Range	S.D.
Wing Length								
Mid-Western Australia	13	54.1	52.0-55.0	0.87	15	53.3	52.0-55.0	0.77
Pilbara	39	54.8	52.5-57.5	1.23	20	54.7	52.0-57.0	1.29
Kimberley	18	54.7	52.5-59.5	1.73	14	55.0	50.5-58.0	2.07
Wyndham	5	55.9	53.5-57.0	1.43	2	55.0	54.0-57.0	2.12
Melville I.	11	54.6	52.0-58.0	1.78	8	55.1	54.0-56.0	0.86
Northern Territory	10	56.1	55.0-58.0	1.05	8	55.3	54.0-56.0	1.00
Gulf of Carpentaria	20	56.5	53.5-59.5	1.45	15	56.6	55.0-58.0	1.27
North-east Queensland					3	53.7	52.0-56.0	2.08
Tail Length								
Mid-Western Australia	13	40.9	39.0-42.5	1.13	14	40.8	39.0-42.0	0.87
Pilbara	38	41.9	39.0-45.0	1.62	19	41.7	38.5-44.0	1.51
Kimberley	18	41.2	39.0-44.5	1.34	13	40.2	38.5-43.5	2.03
Wyndham	5	41.1	39.5-43.0	1.55	2	40.3	40.0-40.5	0.35
Melville I.	10	40.7	39.0-43.0	1.34	8	41.8	39.0-44.0	1.60
Northern Territory	10	42.7	40.0-44.5	1.36	8	41.9	39.5-44.5	1.55
Gulf of Carpentaria	18	42.6	40.0-45.0	1.52	15	42.3	40.5-45.0	1.23
Bill Length								
Mid-Western Australia	12	12.8	12.2-13.4	0.44	15	12.4	10.7-13.3	0.66
Pilbara	36	12.9	12.1-13.6	0.36	21	13.1	12.2-13.6	0.34
Kimberley	15	13.5	12.8-14.5	0.51	14	13.3	12.6-14.0	0.44
Wyndham	5	13.9	13.5-14.6	0.43	2	13.6	13.2-14.0	0.57
Melville I.	9	13.9	13.2-14.5	0.54	7	13.8	12.8-14.3	0.61
Northern Territory	9	14.4	14.0-14.8	0.30	8	14.2	13.2-15.2	0.60
Gulf of Carpentaria	19	14.2	13.3-14.9	0.42	14	14.3	14.0-14.9	0.29

Table 19 Measurements (mm) of *Cracticus quoyi*.

Population	Males				Females			
	No.	Mean	Range	S.D.	No.	Mean	Range	S.D.
Bill Length								
Northern Territory	11	60.7	58.0-65.5	2.40	8	53.9	52.0-56.0	1.30
Aru Islands	3	58.2	56.0-60.5	2.25	4	50.9	48.0-54.0	2.46
New Guinea*	29	57.7	54.0-63.0	2.29	29	52.7	47.0-60.0	3.12
Daru-Merauke	8	56.4	53.0-59.0	2.11	2	54.8	53.5-56.0	1.76
Cape York Peninsula	5	52.3	51.0-54.5	1.35	7	49.7	46.5-55.5	2.91
North-east Queensland	40	54.1	48.5-59.0	1.99	21	49.1	45.0-53.5	2.13
Central Queensland	1	53.5						
Bill Width								
Northern Territory	10	13.4	12.5-14.4	0.49	9	13.1	12.4-13.9	0.45
Aru Islands	3	14.1	13.6-14.6	0.50	3	12.9	12.1-13.4	0.72
New Guinea*	20	15.4	14.2-16.5	0.68	23	14.8	13.4-16.2	0.71
Daru-Merauke	8	13.6	13.3-14.9	0.60	2	14.6	13.7-15.4	1.20
Cape York Peninsula	5	13.1	12.8-13.5	0.34	7	12.7	11.9-13.7	0.68
North-east Queensland	40	13.0	11.4-14.6	0.73	22	12.7	11.4-13.6	0.62
Central Queensland	1	12.4						
Wing Length								
Northern Territory	11	201	196-205	3.75	8	187	181-195	4.82
Aru Islands	3	193	188-197	4.51	4	180	176-188	5.56
New Guinea*	33	180	169-192	6.51	32	176	160-185	6.68
Daru-Merauke	8	189	175-196	7.99	2	183	173-192	13.4
Cape York Peninsula	6	177	171-183	5.15	7	172	166-178	4.95
North-east Queensland	40	174	166-185	4.42	22	166	156-170	3.46
Central Queensland	1	174						
Tail Length								
Northern Territory	11	155	145-163	5.34	8	145	139-151	4.43
Aru Islands	3	150	146-153	3.79	4	142	138-145	2.94
New Guinea*	19	138	131-150	5.05	23	136	124-148	6.36
Daru-Merauke	8	147	136-157	7.59	2	138	134-142	5.66
Cape York Peninsula	6	147	142-154	4.59	7	139	130-145	6.24
North-east Queensland	40	142	134-148	4.98	22	135	124-139	3.62
Central Queensland	1	144						

*Exeludes region between Daru and Merauke

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